

AMENDMENTS

Claims Listing:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method of electrowinning copper comprising:

providing an electrolytic cell comprising at least one flow-through anode and at least one cathode, wherein said cathode has an active surface area;

providing a flow of electrolyte ~~through~~ to said electrolytic cell, wherein said electrolyte comprising copper and solubilized ferrous iron, and wherein said electrolyte flow is provided to said electrolytic cell via an electrolyte manifold comprising a plurality of injection holes;

oxidizing at least a portion of said solubilized ferrous iron in said electrolyte at the at least one flow-through anode from ferrous iron to ferric iron;

removing at least a portion of said copper from said electrolyte at the at least one cathode; and

operating said electrolytic cell at a cell voltage and at a current density, wherein said cell voltage is less than about 1.5 Volts and wherein said current density is greater than about 26 amperes per square foot of active cathode.
2. (Canceled)
3. (Canceled)
4. (Previously Presented) The method according to claim 1, wherein operating said electrolytic cell at a cell voltage comprises operating said electrolytic cell at a cell voltage less than about 1.2 Volts.

5. (Previously Presented) The method according to claim 1, wherein operating said electrolytic cell at a cell voltage comprises operating said electrolytic cell at a cell voltage less than about 1.0 Volts.

6. (Currently Amended) The method according to claim 1, wherein said step of providing flow of electrolyte ~~through~~ to said electrolytic cell comprises providing an electrolyte flow rate of from about 0.1 to about 1.0 gallons per minute per square foot of active cathode.

7. (Currently Amended) The method according to claim 1, wherein said step of providing flow of electrolyte ~~through~~ to said electrolytic cell comprises providing an electrolyte flow rate of from about 0.1 to about 0.25 gallons per minute per square foot of active cathode.

8. (Canceled)

9. (Currently Amended) The method according to claim 1 [8], wherein said at least one flow-through anode comprises a metallic step of oxidizing at least a portion of said solubilized ferrous iron in said electrolyte at an anode comprising titanium mesh having an electrochemically active coating.

10. (Original) The method according to claim 1, wherein said step of providing a flow of electrolyte comprises providing a flow of electrolyte having an iron concentration of from about 10 g/L to about 60 g/L.

11. (Original) The method according to claim 1, wherein said step of providing a flow of electrolyte comprises providing a flow of electrolyte having an iron concentration of from about 20 g/L to about 60 g/L.

12. (Original) The method according to claim 1, wherein said step of providing a flow of electrolyte further comprises maintaining the temperature of said electrolyte in the range of from about 110°F to about 180°F.

13. (Original) The method according to claim 1, wherein said step of providing a flow of electrolyte further comprises maintaining the temperature of said electrolyte above about 115°F.

14. (Original) The method according to claim 1, wherein said step of providing a flow of electrolyte further comprises maintaining the temperature of said electrolyte above about 150°F.

15. (Previously Presented) The method according to claim 1, further comprising:
removing at least a portion of said ferric iron from said electrolytic cell in an electrolyte regeneration stream;
reducing at least a portion of said ferric iron in said electrolyte regeneration stream to ferrous iron to form a regenerated electrolyte stream; and
returning at least a portion of said regenerated electrolyte stream to said electrolytic cell.

16. (Original) The method according to claim 15, wherein said step of reducing at least a portion of said ferric iron comprises contacting said ferric iron with a reducing agent in the presence of a catalyst.

17. (Currently Amended) The method according to claim 16 [9], wherein said step of reducing at least a portion of said ferric iron comprises contacting said ferric iron with sulfur dioxide gas in the presence of a catalyst.

18. – 25 (Cancelled)

26. (New) The method according to claim 9, wherein said metallic mesh anode encases said plurality of injection holes.

27. (New) The method according to claim 1, wherein said plurality of injection holes inject said electrolyte flow from at least one of the floor and the ceiling of the electrolytic cell.